J. HYM. RES.
Vol. 12(2), 2003, pp. 278–302

Morphological Variation in *Opius* Wesmael (Hymenoptera: Braconidae) with an Emphasis on Nearctic Species in the Subgenus *Gastrosema* Fischer

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Abstract.—The variability of morphological characters and their potential phylogenetic utility in Opiinae are evaluated using Nearctic species in the subgenus *Gastrosema* Fischer. Diagnoses for three species groups within Nearctic *Gastrosema* are provided, and 43 Nearctic species in *Opius* Wesmael are placed in the species groups. Two new Nearctic species in *Gastrosema* are described: ***Opius abbyae* Kula** and ***O. lacopitaensis* Kula.** Five previously described Nearctic species in *Gastrosema* are redescribed: *O. castaneigaster* Fischer, *O. intermissus* Fischer, *O. oscinidis* (Ashmead), *O. salmonensis* Fischer, and *O. striativentris* Gahan. ***Opius gracillariae* Gahan** is designated a **junior synonym** of ***O. striativentris.***

Opiinae is a very large subfamily in Braconidae with approximately 1,500 described species worldwide (Wharton 1997b). All valid rearing data suggest that species in Opiinae are strict koinobiont endoparasitoids of cyclorrhaphous Diptera (Wharton 1999). *Opius* Wesmael is the largest genus in Opiinae, and over 1,000 species are currently placed in *Opius sensu* Fischer (1972). In a series of regional revisions, Fischer (1972, 1977, 1987) segregated species in *Opius* into 27, 30, and 34 subgenera, respectively. Most of the subgenera are broadly defined and lack features that clearly characterize them as monophyletic. Further, the defining feature of several subgenera, including *Gastrosema* Fischer, *Merotrachys* Fischer, *Phaedrotoma* Förster *sensu* Fischer (1972), and *Tolbia* Cameron *sensu* Fischer (1972), is the presence or absence of sculpture associated with specific anatomical features. Intraspecific variation of sculpture has never been assessed for species in these subgenera, and preliminary sorting indicates that certain species fit the concept of more than one subgenus. Therefore, the morphological limits of these subgenera need to be evaluated. This research begins to address these problems by performing a detailed assessment of intraspecific morphological variation for Nearctic species in *Gastrosema*.

Other than Fischer's (1977) revision of New World Opiinae, there has been little work on Nearctic species in *Gastrosema*. Gahan (1915) described two Nearctic species currently included in *Gastrosema* and provided a key to the North American species in *Opius*. Fischer (1964, 1970) described several Nearctic species in *Opius* that were subsequently placed in *Gastrosema* by Fischer (1977). Marsh (1974) synonymized two Nearctic species in *Gastrosema*, but insufficient material was examined to assess intraspecific morphological variation. Additional specimens must be acquired and compared with the holotypes to confirm Marsh's synonymies. Van Achterberg (1997) transferred *O. pumilio* Wesmael (the type species for *Gastrosema*) to *Phaedrotoma sensu* van Achterberg and Salvo (1997). This action suggests that van Achterberg (1997) treated *Gastrosema* Fischer 1972 as a junior synonym of *Phaedrotoma* Förster 1862, although this was not explicitly stated. Since only some species currently classified as *Gastrosema* possess the characters used to define *Phaedrotoma sensu* van Achterberg and Salvo (1997), synonymy seems inappropriate. Additionally, *Phaedrotoma sensu* van Achterberg and Salvo (1997) is partially defined by the absence of a basal mandibular tooth which the authors regarded as plesiomorphic. It appears that *Phaedrotoma sensu* van Achterberg and Salvo (1997) has not been defined as a monophyletic group, and I see no advantage in accepting the changes proposed by van Achterberg (1997) over Fischer's (1972) concept of *Gastrosema*.

MATERIALS AND METHODS

Specimens used in this study were borrowed from several North American museums and collections. The American Entomological Institute (AEI), the California Academy of Sciences (CAS), the Canadian National Collection of Insects (CNCI), the Insect Research Collection at the University of Wisconsin-Madison (IRCW), the Museum of Comparative Zoology at Harvard University (MCZ), the insect collection at Texas A&M University (TAMU), and the United States National Museum of Natural History (USNM) provided determined and undetermined opiines. In addition to the borrowed material, two opiine species treated in this study were reared from isolated puparia. Dr. Sonja J. Scheffer provided several hundred specimens of *O. striativentris* Gahan reared from five species of *Phytomyza* Fallén mining the leaves of seven species of *Ilex* L. (hollies). Eighteen specimens of an undescribed opiine were reared by the author from a species of *Calycomyza* Hendel mining the leaves of *Helianthus annuus* L. (sunflower).

Species treated in this study can be identified to Opiinae using Sharkey (1997) and to *Opius* using Wharton (1997a). Several hundred Nearctic species in at least 11 subgenera have not yet been examined but potentially fall into the species groups treated in this paper. As a result a comprehensive key to the Nearctic species in each species group cannot be provided at this time. Therefore, a detailed diagnosis is provided for each species group and species to facilitate their identification.

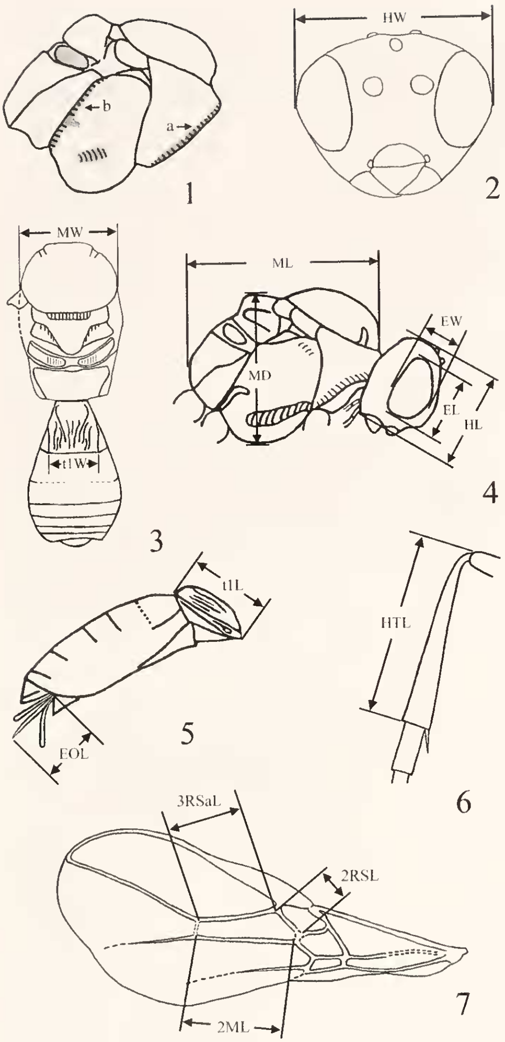
Descriptive terminology for anatomical features, including wing cells and veins, is based on Sharkey and Wharton (1997). Terminology used to describe surface sculpture follows Harris (1979) and Sharkey and Wharton (1997). Two anatomical terms used throughout this work are not found in Harris (1979) or Sharkey and Wharton (1997). Both terms must be defined and illustrated to provide maximum clarification. The anterior pronotal furrow is a groove located at the antero-lateral edge of the pronotum just posterior to the propleural flange, and the posterior mesopleural furrow is a groove located at the posterior edge of the mesopleuron just anterior to the metapleuron (Fig. 1).

Several measurements were taken to quantitatively characterize each species described or redescribed in this study (Figs. 2–7). Two criteria were used to select measurements: 1) measurements historically used in opiine species descriptions and 2) measurements that describe the general size and shape of each species.

MORPHOLOGICAL VARIATION

Results from the analysis of intraspecific morphological variation provide a basis for discussing character variability and their potential phylogenetic utility in Opiinae. The following section is an assessment of characters potentially useful for supporting monophyletic groups, as well as characters useful for defining the limits of species.

Size and shape of clypeus.—Fischer (1972) used the exposure of the labrum in frontal view (a result of clypeus length) to partially define certain subgenera. For exam-

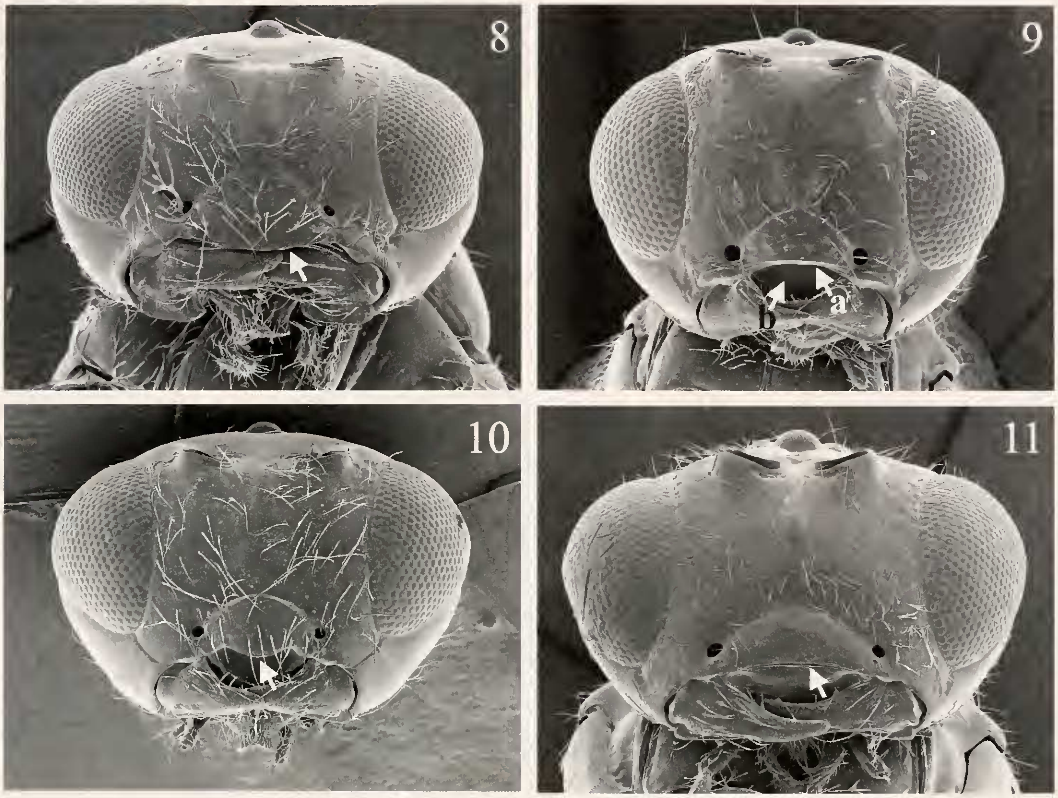


Figs. 1–7. 1, Anterior pronotal furrow (arrow a) and posterior mesopleural furrow (arrow b). 2, Head width (HW). 3, Mesosoma width (MW) and tergite 1 width (t1W). 4, Head length (HL), eye length (EL), eye width (EW), mesosoma length (ML), and mesosoma depth (MD). 5, Tergite 1 length (t1L) and exposed ovipositor length (EOL). 6, Hind tibia length (HTL). 7, 2RS length (2RSL), 3RSa length (3RSaL), and 2M length (2ML). Figs. 1 and 3–5 modified from Fischer (1972).

ple, species that Fischer included in *Stomosema* Fischer possess a broad clypeus completely concealing the labrum (Fig. 8). Alternatively, species that Fischer included in *Gastrosema* have a reduced clypeus exposing the labrum in frontal view (Fig. 9).

Three basic clypeal morphologies are observed among Nearctic species in *Gastrosema.* Both *O. oscinidis* (Ashmead) and *O. walleyi* Fischer possess a flattened or convex clypeus with the ventral margin lobed mesally (Fig. 10). This condition is also commonly observed for Nearctic species in *Rhogadopsis* Brèthes *sensu* Wharton (1987) and *Thoracosema* Fischer. *Opius striativentris* possesses a convex, hemispherical to narrowly hemielliptical shaped clypeus with a straight to slightly arched ventral margin (Fig. 9). This is the most commonly observed clypeal shape for Nearctic species in *Gastrosema* and is also commonly observed for Nearctic species in *Phaedrotoma sensu* Fischer (1972) and *Tolbia sensu* Fischer (1972). Both *O. flaviceps* Gahan and *O. salmonensis* Fischer possess a flattened, broadly hemielliptical shaped clypeus with a straight to slightly arched ventral margin (Fig. 11). This clypeal shape is also commonly observed for Nearctic species in *Pleurosema* Fischer. The consistency of clypeus size and shape within a species, coupled with the variability of clypeus size and shape among groups of species, suggests that this character is potentially phylogenetically informative and merits consideration in future phylogenetic analyses.

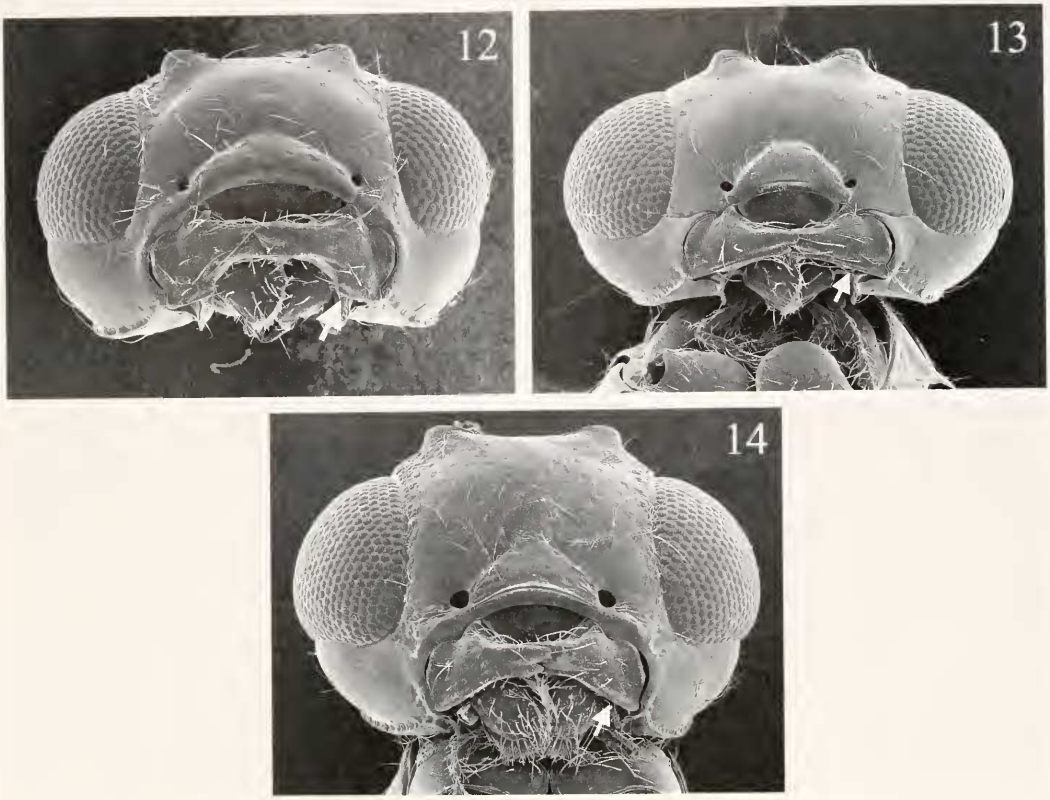
Shape of mandibles.—Mandible shape is another feature Fischer (1972) used to partially define certain subgenera. For example, *Opiognathus* Fischer and *Opiostomus* Fischer contain species with mandibles that are abruptly widened distally to proximally (basal tooth present) (Fig. 12). In more recent revisionary work, van Achterberg and Salvo (1997) used mandible shape to split *Opius sensu lato* into two genera: *Opius* and *Phaedrotoma. Opius sensu* van Achterberg and Salvo (1997) includes species that possess a distinct basal tooth, while *Phaedrotoma sensu* van Achterberg and Salvo (1997) includes species that lack a distinct basal tooth (Fig. 13).



Figs. 8–11. Size and shape of clypeus. 8, Broad and completely concealing labrum. 9, Reduced (arrow a) and exposing labrum (arrow b). 10, Ventral margin lobed mesally. 11, Broadly hemielliptical with slightly arched ventral margin.

Van Achterberg and Salvo (1997) explicitly regarded the presence of a basal tooth as apomorphic. Thus, if the presence of a basal tooth is apomorphic, *Phaedrotoma sensu* van Achterberg and Salvo (1997) is partially defined by a symplesiomorphy. The nomenclatural changes in van Achterberg and Salvo (1997) collapse the subgeneric classification established by Fischer (1972, 1977, 1987). The species currently included in *Opius sensu lato* are segregated into the putatively monophyletic genus *Opius sensu stricto* or the seemingly paraphyletic genus *Phaedrotoma sensu lato*. Species with mandibles that are gradually widened distally to proximally (Fig. 14) cannot be unequivocally placed in either genus. Additionally, species that exhibit distinct similarities in clypeal shape, body sculpture, and wing venation (e.g. *O. relativus* Fischer and *O. salmonensis*) fall into different genera. Because of these shortcomings I see no reason to adopt the classification proposed by van Achterberg and Salvo (1997) over Fischer (1972, 1977, 1987).

The Nearctic species of *Opius sensu lato* that fall within *Gastrosema* vary extensively in mandibular shape. In *O. lacopitaensis* Kula, new species (described below) the basal tooth is obviously absent in most individuals but gradually widened distally to proximally in some individuals. The absence of the basal tooth is the most commonly observed condition for Nearctic species in *Gastrosema*. The continuous nature of this character makes it very difficult to code into discrete character states

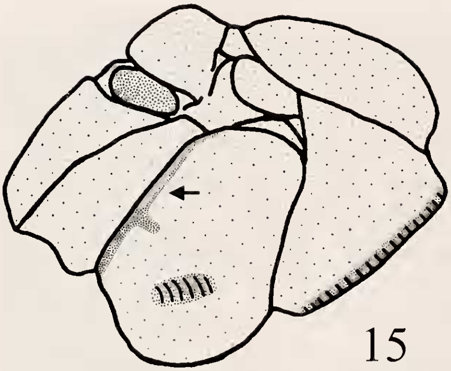


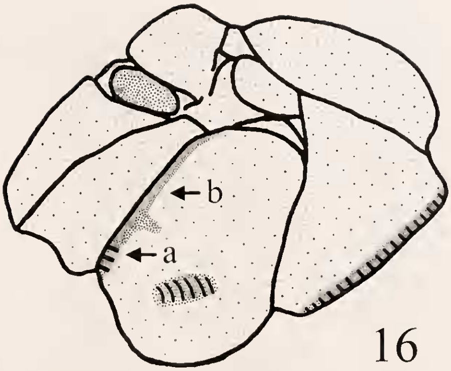
Figs. 12–14. Mandibles. 12, Basal tooth distinctly present. 13, Basal tooth completely absent. 14, Gradually widened distally to proximally.

for certain species. However, species such as *O. salmonensis* consistently lack a basal tooth, and species such as *O. relativus* consistently possess a distinct basal tooth. *Opius tangens* Fischer is another Nearctic species in *Gastrosema* that possesses a distinct basal tooth. Unfortunately, only one individual was available for examination, so intraspecific variation of mandibular shape is not known for *O. tangens*. Nearctic species in several subgenera exhibit variation in mandibular shape similar to Nearctic species in *Gastrosema*. *Phaedrotoma sensu* Fischer (1972) and *Pleurosema* contain species that either obviously lack or distinctly possess a basal tooth, as well as species with mandibular shapes that cannot be reliably determined as basal tooth present or absent. The results from this study suggest that mandible shape is useful for distinguishing between certain species but may not be possible to code unambiguously for phylogenetic analyses.

Sculpture associated with posterior mesopleural furrow.—Fischer (1972) segregated species in *Opius* into different subgenera based on the presence or absence of crenulations within the posterior mesopleural furrow. This interpretation is inadequate because within a species the posterior mesopleural furrow can be either entirely smooth or crenulate below but smooth above the episternal scrobe. Nearctic species in *Gastrosema* that exhibit this condition include *O. abbyae* Kula, new species (described below) (Figs. 15–16).

An entirely smooth posterior mesopleural furrow is found in the majority of Nearctic species in *Gastrosema*. Yet several species in *Gastrosema* consistently possess



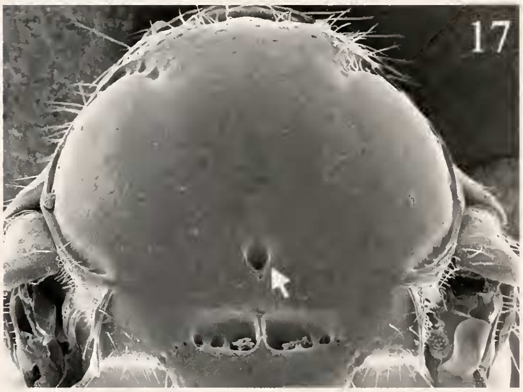


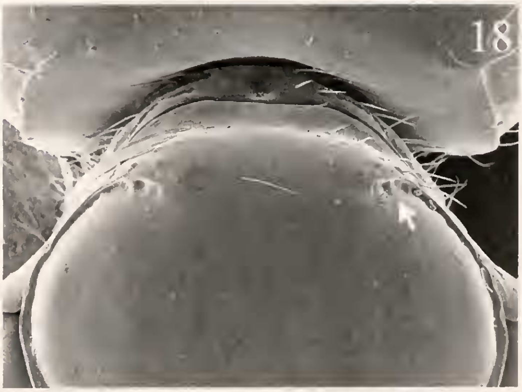
Figs. 15–16. Posterior mesopleural furrow. 15, Entirely smooth. 16, Crenulate below (arrow a) but smooth above (arrow b) episternal scrobe. Figs. modified from Fischer (1972).

an entirely crenulate posterior mesopleural furrow (Fig. 1). *Opius flaviceps, O. relativus, O. salmonensis,* and *O. tangens* are Nearctic species in *Gastrosema* that possess an entirely crenulate posterior mesopleural furrow. Additionally, several Nearctic species in *Pleurosema* consistently possess an entirely crenulate posterior mesopleural furrow. When interpreting this character in phylogenetic analyses, the location of crenulations in the posterior mesopleural furrow is more informative than the mere presence or absence of crenulations and may be important for establishing homology.

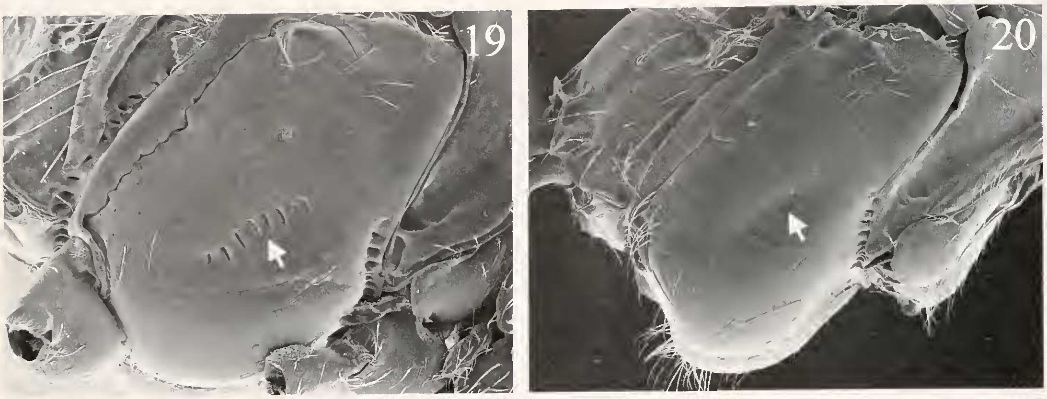
Presence or absence of mesoscutal midpit.—Fischer (1972) used the presence or absence of the mesoscutal midpit (Fig. 17) to divide the subgenera of *Opius* into two roughly equal sized groups. The assessment of variation conducted in this study confirms the potential phylogenetic utility of this character. Midpit shape and depth vary intraspecifically in Opiinae, but the midpit is consistently present or absent for a particular species. All Nearctic species in *Gastrosema* consistently lack a midpit, but there are several Nearctic species in other subgenera that consistently possess a midpit. Because the midpit can be quite reduced within a species, specimens should be examined at the appropriate angle and with light dispersing plastic (mylar).

Presence, absence, and sculpture associated with notauli.—Species in Opiinae exhibit several character states associated with the notauli. Historically, the length of the notauli has been used to group putatively





Figs. 17–18. 17, Mesoscutal midpit. 18, Notauli represented by shallow anterior depressions.

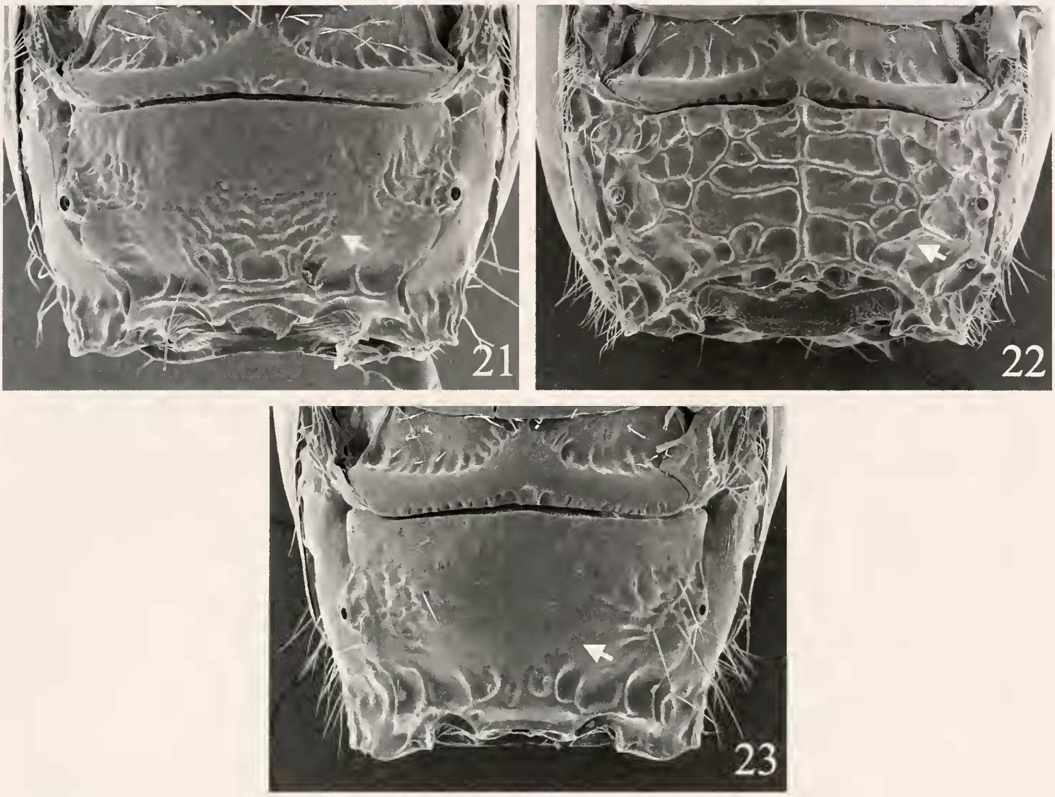


Figs. 19–20. Sternaulus. 19, Short, narrow, and crenulate. 20, Represented by a smooth depression.

closely related species (Fischer 1972). However, the presence or absence of crenulations within the notauli, as well as the termination point of the notauli, may provide additional useful information for phylogenetic inference. Among Nearctic species in *Gastrosema*, the notauli are shallow or deep anterior depressions that can be sculptured or unsculptured (Fig. 18).

Presence, absence, and sculpture associated with sternaulus.—Fischer (1972) used the following three attributes to partially define certain subgenera: sternaulus absent, sternaulus present and smooth, and sternaulus present and sculptured (e.g. crenulate). *Gastrosema* is partially defined by the presence of sculpture within the sternaulus. The most commonly observed condition for Nearctic species in *Gastrosema* is a relatively short and narrow sternaulus with crenulate sculpture (Fig. 19). However, examination of multiple individuals for several Nearctic species in *Gastrosema* revealed that the sternaulus can vary from a smooth depression (Fig. 20) to distinctly crenulate within a species. Species that exhibit this condition include *O. lacopitaensis* and *O. striativentris*. Further, species such as *O. castaneigaster* Fischer often possess a very weakly sculptured sternaulus that can appear unsculptured using a stereomicroscope with a fiber optic illuminator. Despite this large breadth of variation, Fischer (1972) used the presence and absence of sculpture within the sternaulus to place species in *Gastrosema* and *Phaedrotoma*, respectively. Because the presence and absence of sculpture within the sternaulus can vary intraspecifically, certain Nearctic species in *Phaedrotoma sensu* Fischer (1972) potentially share a most recent common ancestor with certain Nearctic species in *Gastrosema*. The high level of intraspecific variation in sternaulus sculpture limits the use of this character in phylogenetic analyses. If sculpture within the sternaulus is utilized in future phylogenetic analyses, the location of the sternaulus and the type of sculpture within the sternaulus are important for establishing homology.

Sculpture associated with propodeum.—The presence or absence of propodeal sculpture is a major defining feature for several subgenera in *Opius*. In Fischer (1972) the presence or absence of propodeal sculpture is the only attribute differentiating species in *Merotrachys* and *Phaedrotoma*, respectively. The presence, absence, and type of propodeal sculpture are quite variable among Nearctic species in *Gastrosema*, but these attributes are only slightly variable within a species. For example, in *O. striativentris* the propodeum is rugulose to rugose (Fig. 21), in *O. intermissus* Fischer the propodeum is always rugose, and in *O. salmonensis* the propodeum is always areolate-rugose (Fig. 22).



Figs. 21–23. Propodeal sculpture. 21, Rugulose. 22, Areolate-rugose. 23, Smooth with rugulose sculpture surrounding spiracles.

The majority of Nearctic species in *Gastrosema* possess a rugulose to rugose propodeum. However, species that possess an areolate-rugose propodeum are also commonly encountered. Further, species with an areolate-rugose propodeum usually have an entirely crenulate posterior mesopleural furrow. Nearctic species that exhibit this condition include *O. flaviceps, O. relativus, O. salmonensis,* and *O. tangens.* The majority of Nearctic species in *Pleurosema* also possess an areolate-rugose propodeum and an entirely crenulate posterior mesopleural furrow. Thus, certain Nearctic species in *Pleurosema* potentially share a most recent common ancestor with certain Nearctic species in *Gastrosema.* Of the described Nearctic species in *Gastrosema,* only *O. hancockanus* Fischer has a nearly entirely smooth propodeum (Fig. 23). A trace of rugulose sculpturing surrounds the propodeal spiracles, but the rest of the propodeum is completely smooth. This condition is also commonly observed for Nearctic species in *Phaedrotoma sensu* Fischer (1972).

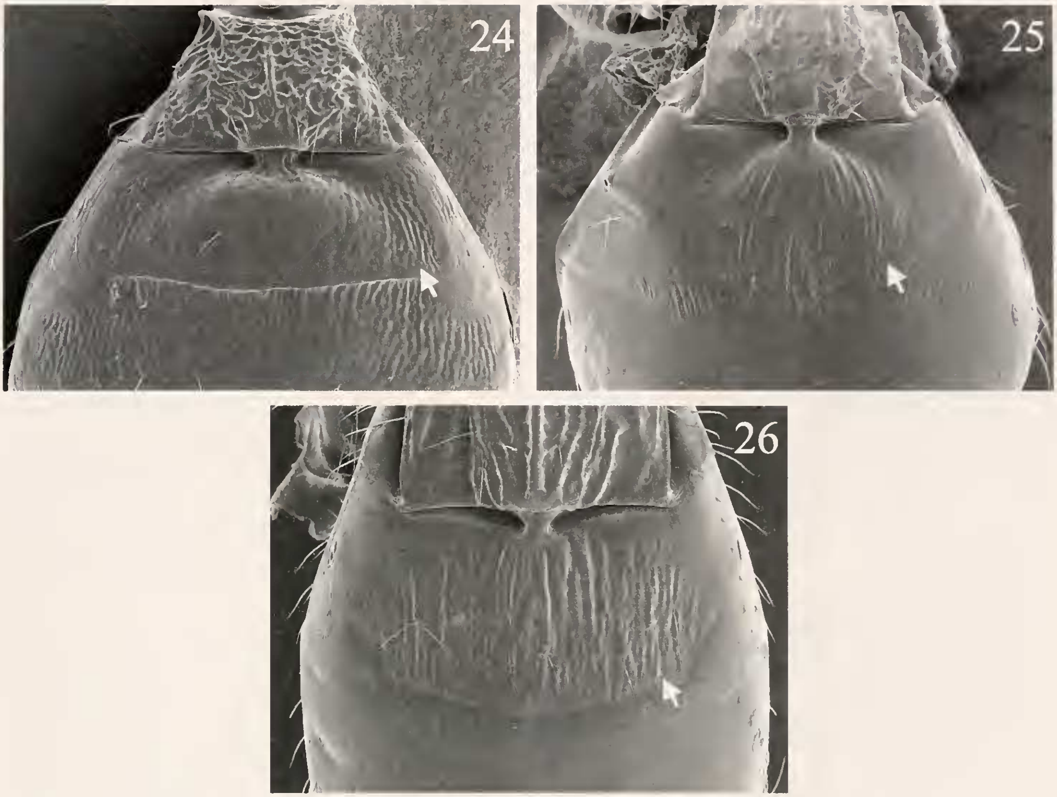
Propodeal sculpture can be assigned distinct character states, and different types of propodeal sculpture often correlate with sculpture in the posterior mesopleural furrow. Species with an areolate-rugose propodeum frequently have an entirely crenulate posterior mesopleural furrow, and species with a smooth or rugulose to rugose propodeum typically do not have an entirely crenulate posterior mesopleural furrow. Consideration of propodeal sculpture in phylogenetic analyses must go beyond the presence or absence of sculpture. Different types of propodeal sculpture, and the correlation between propodeal sculpture and sculpture associated with other anatomical features, should be considered.

Sculpture associated with median abdominal tergites.—In Fischer's original diagnosis for *Gastrosema*, a major defining feature was the presence of "shagreened" or coriaceous sculpture on abdominal tergite two (t2) (Fig. 24) (Fischer 1972). Examination of the Nearctic species in *Gastrosema* treated by Fischer (1977) revealed that *Gastrosema* was not limited to species with a coriaceous t2. Rather, species with a carinate or costate t2 were included as well (Figs. 25–26). The vast majority of Nearctic species included in *Gastrosema* have a coriaceous t2. Examples include *O. abbyae, O. castaneigaster, O. intermissus, O. lacopitaensis,* and *O. striativentris. Opius flaviceps* and *O. salmonensis* are two species that possess a costate t2, and *O. oscinidis* possesses a carinate t2. Neither costate nor carinate sculpture on t2 is common among Nearctic species in *Gastrosema*, but a carinate t2 is commonly observed for several Nearctic species in *Rhogadopsis sensu* Wharton (1987) and *Thoracosema.* In terms of intraspecific variation, species with a coriaceous t2 show little variation in sculpture density. Conversely, species with a carinate or costate t2 exhibit substantial intraspecific variation in sculpture density. In *O. oscinidis* the carinations are extremely reduced in some individuals, and t2 appears smooth unless the specimens are examined at several angles using mylar and a variety of light intensities. Yet the carinations on t2 are unmistakably present in other individuals. Thus, sculpture on t2 has potential phylogenetic importance but may be difficult to code unambiguously for certain species.

Configuration of forewing venation.—Fischer (1972) used the position of vein 1m-cu relative to vein 2RS to segregate species into certain subgenera. For example, species that Fischer placed in *Phlebosema* Fischer possess vein 1m-cu basad or directly in line with vein 2RS (Figs. 27–28). *Phlebosema* is currently a junior synonym of *Baeocentrum* Schulz, but this nomenclatural change does not alter Fischer's concept of *Phlebosema* (Wharton 1987). Alternatively, species that Fischer placed in *Gastrosema* possess vein 1m-cu distad vein 2RS (Fig. 29). The results of this study confirm that species with vein 1m-cu basad vein 2RS occasionally display vein 1m-cu directly in line with vein 2RS. Further, species with vein 1m-cu distad vein 2RS never exhibit vein 1m-cu directly in line with or basad vein 2RS. All described Nearctic species in *Gastrosema* have vein 1m-cu distad vein 2RS. However, the Nearctic species in *Baeocentrum sensu* Wharton (1987) and certain Nearctic species in *Merotrachys* and *Tolbia sensu* Fischer (1972) have vein 1m-cu basad or directly in line with vein 2RS. Thus, the position of vein 1m-cu relative to vein 2RS should be evaluated in future phylogenetic analyses.

The size and shape of the forewing stigma is another character of potential phylogenetic importance. The Nearctic species in *Gastrosema* exhibit minimal intraspecific variation in stigma size and shape, but stigma size and shape can vary substantially from species to species. Several Nearctic species in *Gastrosema* exhibit conspicuous similarities in stigma size and shape. *Opius abbyae, O. castaneigaster, O. intermissus, O. lacopitaensis,* and *O. striativentris* possess a narrow and elongate stigma (Fig. 28), while *O. flaviceps, O. relativus, O. salmonensis,* and *O. tangens* possess a wedge shaped stigma (Fig. 29). In future studies stigma size and shape should be thoroughly examined for species in other opiine subgenera.

Color.—In Opiinae color is not of any apparent phylogenetic importance but is useful for distinguishing between morphologically similar species. For example, *O. intermissus* and *O. niobe* Fischer are similar in size and shape but have conspicuously different coloration on the head and mesosoma. Species such as *O. striativentris*

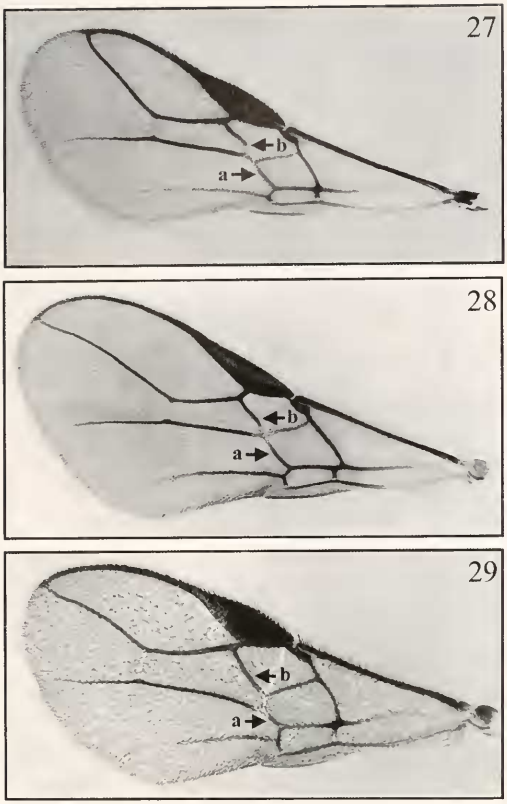


Figs. 24–26. Sculpture on t2. 24, Coriaceous. 25, Carinate. 26, Costate.

are variable in color, while color is more conserved in species such as *O. abbyae.* Thus, it is important to examine several individuals to determine the entire spectrum of color within a species. Proper specimen preparation is essential for preserving natural coloration. Specimens exposed to light for prolonged periods of time become lighter, and air-dried specimens tend to darken. Material preserved in alcohol for extended periods of time should be stored at low temperatures and protected from direct exposure to light. Specimens should be dehydrated using a critical-point-dryer or chemicals such as amyl acetate and Hexamethyl-Disilazane.

Setation.—Setation is another useful character for distinguishing between morphologically similar species. For example, a species of *Opius* near *extiratus* Fischer possesses a consistently setose propodeum, while setation on the propodeum of *O. striativentris* is usually setiferous and rarely glabrous. *Opius* near *extiratus* and *O. striativentris* are sympatric and have been reared from the same host species on the same host plant. The density of setae on the propodeum is one character that can be used to distinguish these species.

Flagellomere number.—Godfray (1984) demonstrated that in the alysiine *Exotela cyclogaster* Förster flagellomere number increases with body size. Alysiinae and Opiinae form a monophyletic group (Wharton 1988), and it is possible that species in Opiinae also exhibit this trend. Flagellomere number is useful when morphologically similar species have non-overlapping ranges of flagellomere number. For example, *O. abbyae* and *O. intermissus* are morphologically similar, but *O. abbyae* has 19–22 flagellomeres compared to 26–29 in



Figs. 27–29. Position of forewing vein 1m-cu (arrow a) relative to vein 2RS (arrow b). 27, 1m-cu basad 2RS. 28, 1m-cu directly in line with 2RS. 29, 1m-cu distad 2RS.

O. intermissus. When using flagellomere number to distinguish between species, it is important to examine several individuals to establish minimum and maximum flagellomere numbers for each species.

Quantitative characters.—Fischer (1972, 1977, 1987) extensively used quantitative ratios in keys to subgenera, species groups, and species in *Opius,* but the ratios were based on measurements of one or a few individuals. As a result most taxa treated in the keys cannot be reliably identified. A prime example is the treatment of species groups in Fischer's (1977) key to New World *Gastrosema.* The defining character of the *lissopleurum*-group of species is "thorax 1.25–1.40× as long as high." *Opius intermissus* is included in the *lissopleurum*-group, but the results of this study indicate that the thorax is 1.12–1.30× as long as high in *O. intermissus.* Only 33.0% of the specimens examined for *O. intermissus* fit within the morphological limits of the *lissopleurum*-group as defined by Fischer (1977).

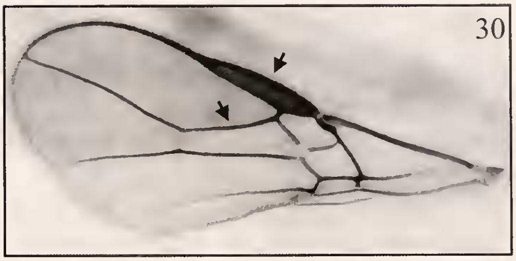
Another problem with the use of quantitative ratios is that measurement error as high as 15.7% can occur when the same specimen is measured on different dates. Factors that contribute to measurement error may be found in Wharton (1980). Given the limitations of quantitative characters, it is preferable to use qualitative characters in phylogenetic analyses and identification systems. However, measurements can be useful for distinguishing certain species. *Opius flaviceps* and *O. salmonensis* are similar in terms of coloration and sculpture, but the two species can be differentiated using ovipositor length, mesosoma length, and mesosoma width. When using measurements to characterize a species, it is optimal to measure several individuals to establish the entire range of variation for each measurement. In cases where only one or a few individuals are available for examination, the taxonomist should consider the usefulness of quantitatively describing the species.

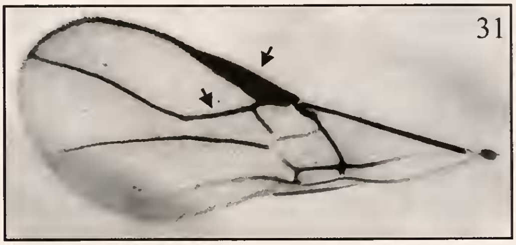
NEARCTIC SPECIES IN THE SUBGENUS *GASTROSEMA*

Species group diagnoses.—With the exception of *O. walleyi,* all described Nearctic species in *Gastrosema* fall into three easily characterized groups that have not been recognized in previous studies (Table 1). A diagnosis of each group is provided to facilitate future studies examining the monophyly and relationships of species in *Opius.* Each group should be viewed as a hypothesis supported by potentially phylogenetically informative characters, and the monophyly of each group will be tested in future phylogenetic analyses. The first three characters presented in each di-

Table 1. Placement of described Nearctic species in *Gastrosema* into three previously unrecognized species groups.

flaviceps-group	*oscinidis*-group	*striativentris*-group
flaviceps	*oscinidis*	*abbyae*
relativus		*adductus*
salmonensis		*alconanus* Fischer
tangens		*castaneigaster*
		clevelandensis
		cordobensis
		deiphobe Fischer
		hancockanus
		intermissus
		lacopitaensis
		niobe
		pallas
		porteri Fischer
		striativentris





Figs. 30–31. Shape of forewing stigma and second submarginal cell. 30, *oscinidis*-group. 31, *striativentris*-group.

agnosis differentiate each group from the remaining *Opius sensu lato.*

flaviceps-group: midpit absent; clypeus reduced, labrum exposed when mandibles closed; 1m-cu distad 2RS; posterior mesopleural furrow crenulate above episternal scrobe; propodeum rugose to areolate-rugose; abdominal tergites posterior to t1 smooth or variously sculptured; forewing stigma usually broad and wedge shaped, second submarginal cell size and shape variable but often shaped as in Fig. 29.

oscinidis-group: midpit absent; clypeus reduced, labrum exposed when mandibles closed; 1m-cu distad 2RS; posterior mesopleural furrow smooth above episternal scrobe; propodeum smooth to rugose; abdominal tergites posterior to t1 smooth or longitudinally carinate; forewing stigma usually narrow and elongate, second submarginal cell long and usually shaped as in Fig. 30.

striativentris-group: midpit absent; clypeus reduced, labrum exposed when mandibles closed; 1m-cu distad 2RS; posterior mesopleural furrow smooth above episternal scrobe; propodeum smooth to rugose; at least one abdominal tergite posterior to t1 coriaceous; forewing stigma usually narrow and elongate, second submarginal cell short and usually shaped as in Fig. 31.

Discussion.—The posterior mesopleural furrow in *O. walleyi* is smooth above the episternal scrobe, and thus, *O. walleyi* does not fall within the *flaviceps*-group. The shape of the second submarginal cell in *O. walleyi* fits the diagnosis for the *oscinidis*-group. However, t2 and t3 are coriaceous which fits the diagnosis for the *striativentris*-group. Thus, *Opius walleyi* possesses characteristics of both the *oscinidis*-group and the *striativentris*-group and is left unplaced at this time.

Opius pumilio (the type species for *Gastrosema*) belongs in the *striativentris*-group. Additionally, several Nearctic species treated in Fischer (1977) were not included in *Gastrosema* but belong in one of the three species groups (Table 2). Thus, if the species groups proposed in this study are monophyletic, subgenera with species that fall within the species groups are obviously not monophyletic.

In future studies of *Opius*, species in *Allophlebus* Fischer, *Gastrosema*, *Hypocynodus* Förster *sensu* Fischer (1972), *Merotrachys*, *Opiothorax* Fischer, *Pendopius* Fischer, *Phaedrotoma sensu* Fischer (1972), *Pleurose-*

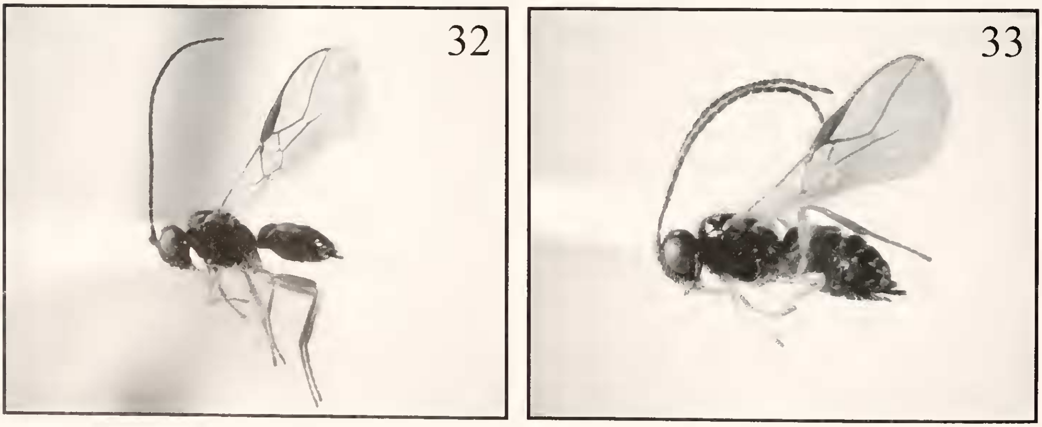
Table 2. Placement of described Nearctic species not included in *Gastrosema* into three previously unrecognized species groups.

flaviceps-group	*oscinidis*-group	*striativentris*-group
O. (*Pleurosema*)	O. (*Rhogadopis*)	O. (*Merotrachys*)
euwattacooanus Fischer	*stenopectus* Fischer	*brownsvillensis* Fischer
hermosanus Fischer	O. (*Thoracosema*)	*lansingensis* Fischer
metatensis Fischer	*crabtreeanus* Fischer	*paulior* Fischer
orizabensis Fischer	*extiratus*	*paulus* Fischer
paratakomanus Fischer	*parkercreekensis* Fischer	*virentis* Fischer
pilosinotum Fischer	*prolongatus* Fischer	O. (*Phaedrotoma*)
sybile Fischer	*pseudocolumbiacus* Fischer	*complicans* Fischer
thalis Fischer	*schuleri* Fischer	O. (*Tolbia*)
O. (*Rhogadopis*)	*southcarolinensis* Fischer	*heroicus* Fischer
northcarolinensis Fischer		

ma, Rhogadopsis sensu Wharton (1987), *Thoracosema,* and *Tolbia sensu* Fischer (1972) should be examined to determine which species group, if any, they fit into. Examination of species in the aforementioned subgenera will almost certainly result in the discovery of species groups in addition to the three discovered during this research. Placement of all described species in these subgenera will be a monumental task, as several hundred holotypes must be examined. The holotypes are housed in repositories found throughout the world, although most are in North American and European museums and collections. Species currently included in subgenera not listed above lack at least one of the three characters used to differentiate the three species groups from the remaining *Opius sensu lato* (see species group diagnoses).

Opius (*Gastrosema*) *abbyae* Kula, new species
Fig. 32

Female.—Head: 1.23–1.36× as wide as long; eyes 0.67–0.77× as wide as long, glabrous; face smooth with rugulose sculpture between antennal sockets and compound eyes, slightly raised mesally, setiferous; clypeus hemielliptical, convex, ventral margin straight, setiferous; mandibles simple, with two apical teeth per mandible, setiferous; antennae with 19–21 flagellomeres. *Mesosoma*: 0.30–0.40 mm wide; 0.51–0.64 mm long; 0.58–0.66× as



Figs. 32–33. *Opius* spp. 32, *O. abbyae*. 33, *O. lacopitaensis*.

wide as long; 0.71–0.81× as wide as deep; 1.10–1.31× as long as deep; pronotum coriaceous laterally, crenulate in anterior furrow; notauli represented by anterior depressions; mesoscutum smooth, setiferous (78.6%) or sparsely setiferous anteriorly and along lines where notauli would run if present (21.4%); mesopleuron nearly entirely smooth, usually rugulose or crenulate near tegulae (85.8%), rarely smooth near tegulae (14.2%), sternaulus distinctly crenulate; scutellar disc smooth; propodeum rugose, setiferous; metapleuron setiferous. *Metasoma*: t1 0.93–1.25× as wide as long, rugulose to rugose; t2 coriaceous; t3 coriaceous; t4 always at least partially coriaceous; remaining tergites smooth; exposed ovipositor 0.11–0.26 mm long. *Legs*: smooth, setiferous, hind tibia 0.95–1.09× as long as mesosoma length. *Wings*: hyaline; forewing stigma narrow and elongate; 2RS 0.53–0.71× as long as 3RSa; 2RS 0.41–0.50× as long as 2M; 3RSa 0.70–0.77× as long as 2M. *Color*: head entirely very dark brown to black; mesosoma usually black (85.7%), rarely very dark brown (14.3%); t1 entirely dark brown to nearly entirely dark brown with slight brownish orange coloration laterally; t2 light brown to dark brown medially, orange to yellow laterally; t3 usually brown to dark brown with orange to yellow coloration at antero-lateral edges (85.7%), rarely entirely dark brown (14.3%); t4 usually entirely dark brown (92.9%), rarely brownish yellow (7.1%); remaining tergites dark brown; legs yellow to yellowish brown, prothoracic legs lighter than mesothoracic legs, mesothoracic legs lighter than metathoracic legs, metatibia and metatarsus always yellowish brown.

Male.—As in ♀ except: *Head*: 1.21–1.30× as wide as long; eyes 0.64–0.71× as wide as long; antennae with 20–22 flagellomeres. *Mesosoma*: 0.57–0.61× as wide as long; 1.24–1.32× as long as deep. *Wings*: 2RS 0.50–0.53× as long as 2M. *Color*: mesosoma always black.

Host.—*Calycomyza* sp. mining the leaves of *Helianthus annuus* (TAMU).

Material examined.—Holotype ♀: USA, Nebraska, Arthur County, Highway 61 south of Arthur near Arapaho Prairie, 8.vii.1999, R. R. Kula and A. A. Rogers (TAMU). Paratypes: 6♀, same data as holotype; 2♀, 1♂, same data as holotype except 11.vii.1998; 5♀, 3♂, same data as holotype except 10.vii.1999 (TAMU).

Diagnosis.—Within the *striativentris*-group *O. intermissus*, *O. lacopitaensis*, and *O. weemsi* Fischer are morphologically similar to *O. abbyae*. Head coloration can be used to distinguish *abbyae* from both *intermissus* and *weemsi*. In *abbyae* the head is entirely very dark brown to black. Alternatively, in *intermissus* the head is yellow with the vertex very dark brown to black, and in *weemsi* the head is mostly orange with the vertex very dark brown and the ventral half of the face brown. The number of antennal flagellomeres can also be used to distinguish *abbyae* from *intermissus* and *weemsi*. *Opius abbyae* possesses 19–22 flagellomeres, while *intermissus* possesses 26–29 flagellomeres and *weemsi* possesses 32 flagellomeres. Another character that can be used to differentiate *abbyae* from *intermissus* and *weemsi* is tergite coloration. Tergite 3 in *abbyae* is usually brown to dark brown with orange to yellow coloration at the antero-lateral edges. In *intermissus* t3 is yellow with the posterior edge dark brown, and in *weemsi* t3 is orangish yellow with the posterior edge dark brown. Sculpture on the abdominal tergites can be used to distinguish *abbyae* from *lacopitaensis*. In *abbyae* t4 is always coriaceous, while in *lacopitaensis* t4 is never coriaceous.

Discussion.—*Opius abbyae* falls within the *striativentris*-group. This species exhibits less intraspecific variation in qualitative characters than observed for *intermissus*, *lacopitaensis*, *oscinidis*, and *striativentris*. For example, the sternaulus is consistently crenulate in *abbyae*, while the sternaulus varies from a smooth depression to crenulate in *lacopitaensis* and *striativentris*. Coloration of the head and mesosoma is much less variable in *abbyae* than in *oscinidis* or *striativentris*. No substantial differences were observed between female and male specimens in *abbyae*.

Etymology.—This species is named in honor of Abigail Rogers Kula who assisted in collection of the host.

Opius (*Gastrosema*) *lacopitaensis* Kula, new species

Fig. 33

Female.—*Head*: 1.25–1.36× as wide as long; eyes 0.67–0.73× as wide as long, glabrous; face usually smooth with rugulose sculpture between antennal sockets and compound eyes (92.9%), rarely minutely coriaceous with rugulose sculpture between antennal sockets and compound eyes (7.1%), slightly raised mesally, setiferous; clypeus narrowly hemielliptical to crescent shaped, convex, ventral margin straight to slightly arched, setiferous; mandibles simple to gradually widened distally to proximally, with two apical teeth per mandible, setiferous; antennae with 19–20 flagellomeres. *Mesosoma*: 0.29–0.35 mm wide; 0.51–0.61 mm long; 0.55–0.64× as wide as long; 0.69–0.75× as wide as deep; 1.14–1.27× as long as deep; pronotum often entirely coriaceous laterally (78.6%), occasionally smooth dorsally and coriaceous ventrally (21.4%), crenulate in anterior furrow; notauli represented by anterior depressions; mesoscutum smooth, setiferous anteriorly and along lines where notauli would run if present; mesopleuron nearly entirely smooth, often smooth near tegulae (78.6%), occasionally crenulate near tegulae (21.4%), sternaulus often crenulate (78.6%), occasionally a smooth depression (21.4%); scutellar disc smooth; propodeum rugose, setiferous; metapleuron setiferous. *Metasoma*: t1 0.71–1.00× as wide as long, rugose; t2 coriaceous; t3 coriaceous; remaining tergites smooth; exposed ovipositor 0.16–0.32 mm long. *Legs*: smooth, setiferous, hind tibia 0.88–0.97× as long as mesosoma length. *Wings*: hyaline; forewing stigma narrow and elongate; 2RS 0.56–0.64× as long as 3RSa; 2RS 0.41–0.48× as long as 2M; 3RSa 0.67–0.77× as long as 2M. *Color*: head entirely dark brown to very dark brown; mesosoma entirely dark brown to very dark brown; t1 dark brown; t2 brownish orange to yellow; t3 anterior half to two thirds brownish orange to yellow, posterior half to one third brown; remaining tergites brown to dark brown; legs yellow, posterior portion of metatibia and entire metatarsus yellowish brown.

Male.—As in ♀ except: *Head*: eyes 0.67–0.79× as wide as long; face usually smooth with rugulose sculpture between antennal sockets and compound eyes (90.9%), rarely entirely smooth (9.1%); antennae with 19–22 flagellomeres. *Mesosoma*: 0.54–0.67 mm long; 0.68–0.73× as wide as deep; 1.17–1.38× as long as deep; pronotum often coriaceous laterally (63.6%), occasionally smooth (36.4%); mesopleuron nearly entirely smooth, usually smooth near tegulae (90.9%), rarely crenulate near tegulae (9.1%), sternaulus often a smooth depression (54.6%), occasionally crenulate (45.5%). *Wings*: 2RS 0.56–0.67× as long as 3RSa.

Host.—Unknown.

Material examined.—Holotype ♀: USA, Texas, Jim Wells County, 8 miles west of Ben Bolt, La Copita Research Station, 20.v.1987, J. B. Woolley (TAMU). Paratypes: 11♀, 11♂, same data as holotype; 2♀, same data as holotype except northwest of Ben Bolt, 21.v.1987, G. Zolnerowich (TAMU).

Diagnosis.—Within the *striativentris*-group *O. abbyae*, *O. castaneigaster*, *O. cordobensis* Fischer, and *O. pallas* Fischer are morphologically similar to *O. lacopitaensis*. Characters used to differentiate *lacopitaensis* from *abbyae* and *castaneigaster* can be found in the diagnoses for *abbyae* and *castaneigaster*. *Opius lacopitaensis* can be differentiated from *cordobensis* using propodeal sculpture. In *lacopitaensis* the propodeum is rugulose to rugose, while in *cor-*

dobensis the propodeum is very heavily rugose with conspicuous carinae throughout. The number of antennal flagellomeres can be used to distinguish *lacopitaensis* from *pallas*. *Opius lacopitaensis* possesses 19–22 flagellomeres, while *pallas* possesses 28 flagellomeres.

Discussion.—*O. lacopitaensis* falls within the *striativentris*-group. In Fischer's subgeneric classification individuals with a crenulate sternaulus fall within *Gastrosema*, but individuals with a smooth sternaulus fall within *Merotrachys*. *Opius lacopitaensis* is provisionally placed in *Gastrosema* because the majority of individuals (i.e. 16 of 25) fall within *Gastrosema*.

Opius lacopitaensis exhibits variation in color and sculpture similar to that observed in *castaneigaster*. No substantial differences were observed between female and male specimens in *lacopitaensis*. No biological data are associated with *lacopitaensis*, but other species in the *striativentris*-group have been reared from leaf mining Agromyzidae (e.g. *O. abbyae*, *O. adductus* Fischer, *O. striativentris*).

Etymology.—This species is named after the collection site.

Opius (*Gastrosema*) *castaneigaster* Fischer

Opius castaneigaster Fischer 1964: 413, 419.
Opius (*Gastrosema*) *castaneigaster*: Fischer 1977: 311, 324.

Female.—*Head*: 1.19–1.33× as wide as long; eyes 0.62–0.75× as wide as long, glabrous; face usually smooth with rugulose sculpture between antennal sockets and compound eyes (91.7%), rarely entirely smooth (8.3%), slightly raised mesally, setiferous; clypeus hemispherical, convex, ventral margin straight, setiferous; mandibles simple, with two apical teeth per mandible, setiferous; antennae with 21–24 flagellomeres. *Mesosoma*: 0.30–0.45 mm wide; 0.54–0.82 mm long; 0.53–0.64× as wide as long; 0.79–0.93× as wide as deep; 1.29–1.70× as long as deep; pronotum coriaceous laterally, crenulate in anterior furrow; notauli represented by anterior depressions; mesoscutum smooth, setiferous anteriorly and along lines where notauli would run if present; mesopleuron nearly entirely smooth, usually rugulose or crenulate near tegulae (91.7%), rarely smooth near tegulae (8.3%), sternaulus usually crenulate (91.7%), rarely reduced to a sculptured depression (8.3%); scutellar disc smooth; propodeum rugulose to rugose, setiferous; metapleuron sparsely setiferous to setiferous. *Metasoma*: t1 1.00–1.33× as wide as long, rugulose to rugose; t2 usually coriaceous (91.7%), rarely smooth (8.3%); t3 usually at least partially coriaceous (91.7%), rarely entirely smooth (8.3%); remaining tergites smooth; exposed ovipositor 0.24–0.49 mm long. *Legs*: smooth, setiferous, hind tibia 0.83–0.95× as long as mesosoma length. *Wings*: hyaline; forewing stigma narrow and elongate; 2RS 0.48–0.67× as long as 3RSa; 2RS 0.39–0.50× as long as 2M; 3RSa 0.73–0.84× as long as 2M. *Color*: head entirely brown to dark brown; mesosoma entirely brown to dark brown; t1 brown to dark brown; t2 orange to yellow; t3 anterior half orange to yellow, posterior half brown to dark brown or t3 anterior two thirds orange to yellow, posterior one third brown to dark brown; remaining tergites dark brown; legs orangish yellow to yellow, metatibia and metatarsus usually yellowish brown (83.3%).

Male.—As in ♀ except: *Head*: 1.11–1.26× as wide as long. *Mesosoma*: 0.51–0.60× as wide as long. *Metasoma*: t1 0.86–1.17× as wide as long.

Host.—Unknown.

Material examined.—Holotype ♀: USA, New York, Tompkins County, Ithaca, 7.ix.1935, H. K. Townes (AEI). Allotype ♂: same data as holotype except 1.vi.1935 (AEI). Paratypes: all USA; 1♀, same data as holotype except 30.v.1934; 1♂, New York, Oneida County, Rome, 24.vi.1934, H. K. Townes; 1♀, New York, Delaware County, Hancock, 31.vii.1935, H. K.

Townes; 1♀, 1♂, New York, Otsego County, Oneonta, 17.viii.1935, H. K. Townes; 1♀, New York, Otsego County, Oneonta swamp, 1,900 feet elevation, 18.viii.1935, H. K. Townes; 1♀, Ohio, Summit County, Akron, 18.v.1941, H. K. Townes; 1♀, South Carolina, Greenville County, Greenville, 22.iv.1952, G. and L. Townes; 1♀, South Carolina, Greenville County, Greenville, 31.v.1952, G. and L. Townes; 1♀, South Carolina, Pickens County, Wattacoo, 10.v.1959, G. F. Townes; 1♂, South Carolina, Pickens County, Wattacoo, 6.v.1961, G. F. Townes; 1♀, South Carolina, Pickens County, Wattacoo, 19.v.1961, G. F. Townes (AEI); 1♀, Wisconsin, Polk County, July, collection C. F. Baker (USNM). Other determined material: 1♀, same data as holotype (det. Fischer) (AEI).

Diagnosis.—Within the *striativentris*-group, *O. cordobensis, O. lacopitaensis, O. niobe, O. pallas*, and *O. striativentris* are morphologically similar to *O. castaneigaster*. Propodeal sculpture can be used to distinguish *castaneigaster* from *cordobensis*. In *castaneigaster* the propodeum is rugulose to rugose, while in *cordobensis* the propodeum is very heavily rugose with conspicuous carinae throughout. *Opius castaneigaster* can be differentiated from *niobe* on the basis of mesosoma shape and the number of antennal flagellomeres. In *castaneigaster* the mesosoma is subelliptical (1.29–1.70× as long as deep), and the number of flagellomeres ranges from 21–24. In *niobe* the mesosoma is subspherical (1.21–1.23× as long as deep), and the number of flagellomeres ranges from 25–31. *Opius pallas* is very morphologically similar to *castaneigaster*, but the two species can be differentiated using flagellomere number. *Opius pallas* possesses 28 flagellomeres, while the maximum number of flagellomeres for *castaneigaster* is 24. Several characters can be used to distinguish *castaneigaster* from *striativentris*. Tergite 1 is brown to dark brown in *castaneigaster*, while t1 is usually yellow to brownish orange in *striativentris*. Tergite 3 is only partially coriaceous in *castaneigaster*, as opposed to entirely coriaceous in *striativentris*. Tergite 4 is always smooth in *castaneigaster*, while t4 is smooth or coriaceous in *striativentris*. The mesosoma is uniformly brown or dark brown in *castaneigaster*, while the mesonotum is often conspicuously darker than the rest of the mesosoma in *striativentris*. *Opius castaneigaster* can be differentiated from *lacopitaensis* using t1 width to length ratios, clypeus shape, and the number of flagellomeres. Tergite 1 width in *castaneigaster* is usually greater than or equal to t1 length (91.7%) and is rarely less than t1 length (8.3%). Tergite 1 width in *lacopitaensis* is always less than or equal to t1 length. The shape of the clypeus is hemispherical in *castaneigaster*, while the shape of the clypeus is narrowly hemielliptical to crescent shaped in *lacopitaensis*. *Opius castaneigaster* possesses 21–24 flagellomeres, as opposed 19–22 in *lacopitaensis*.

Discussion.—*Opius castaneigaster* falls within the *striativentris*-group. *Opius pallas* may eventually be determined as a synonym of *castaneigaster*. The two species are very morphologically similar and exhibit overlapping geographic distributions. *Opius pallas* is only known from the holotype, and acquisition of additional specimens may reveal a broader range of flagellomere number.

One specimen of *castaneigaster* examined in this study lacks sculpture on t2 and t3. However, no additional attributes were observed that indicated the specimen was not *castaneigaster*. Single specimens with reduced sculpture are very difficult to identify, and comparison of these individuals with a long series of determined specimens will facilitate their identification. No biological data are associated with *castaneigaster*, but other species in the *striativentris*-group have been reared from leaf mining Agromyzidae (e.g. *O. abbyae, O. adductus, O. striativentris*).

Opius (*Gastrosema*) *intermissus* Fischer

Opius intermissus Fischer 1964: 413, 428.
Opius (*Gastrosema*) *intermissus*: Fischer 1977: 314, 357.

Female.—*Head*: 1.23–1.29× as wide as long; eyes 0.62–0.67× as wide as long, glabrous; face minutely coriaceous with rugulose sculpture between antennal sockets and compound eyes, slightly raised mesally, usually setose (80.0%), rarely setiferous (20.0%); clypeus hemispherical, convex, ventral margin straight, usually setose (80.0%), rarely setiferous (20.0%); mandibles simple, with two apical teeth per mandible, usually setose (80.0%), rarely setiferous (20.0%); antennae with 27–29 flagellomeres. *Mesosoma*: 0.38–0.46 mm wide; 0.64–0.75 mm long; 0.59–0.63× as wide as long; 0.71–0.74× as wide as deep; 1.14–1.21× as long as deep; pronotum coriaceous laterally, crenulate in anterior furrow; notauli represented by anterior depressions; mesoscutum smooth, setiferous anteriorly and along lines where notauli would run if present; mesopleuron nearly entirely smooth, rugulose to crenulate near tegulae, sternaulus distinctly crenulate; scutellar disc smooth; propodeum rugose, setiferous; metapleuron usually setiferous (80.0%), rarely setose (20.0%). *Metasoma*: t1 0.70–1.20× as wide as long, longitudinally rugulose with two prominent dorsal carinae converging posteriorly; t2 coriaceous; t3 coriaceous; remaining tergites smooth; exposed ovipositor 0.18–0.32 mm long. *Legs*: smooth, setiferous, hind tibia 0.96–1.02× as long as mesosoma length. *Wings*: hyaline; forewing stigma narrow and elongate; 2RS 0.52–0.62× as long as 3RSa; 2RS 0.41–0.47× as long as 2M; 3RSa 0.75–0.82× as long as 2M. *Color*: head mostly yellow, vertex very dark brown to black; mesosoma very dark brown to black, mesopleuron occasionally yellowish orange ventrally and near tegulae; t1 brown to dark brown medially, yellow laterally; t2 yellow; t3 yellow with posterior edge dark brown; t4 dark brown medially, yellow laterally, and posterior edge dark brown (60.0%) or t4 mostly yellow with posterior edge dark brown (40.0%); remaining tergites dark brown medially, yellow laterally, and posterior edge dark brown; legs orangish yellow to yellow, posterior portion of metatibia and entire metatarsus yellowish brown.

Male.—As in ♀ except: *Head*: 1.19–1.27× as wide as long; eyes 0.63–0.71× as wide as long; antennae with 26–27 flagellomeres. *Mesosoma*: 0.35–0.42 mm wide; 0.59–0.70 mm long; 0.57–0.65× as wide as long; 0.67–0.77× as wide as deep; 1.12–1.30× as long as deep; mesoscutum usually smooth (80.0%), occasionally minutely coriaceous (20.0%). *Legs*: hind tibia 0.90–1.03× as long as mesosoma length. *Wings*: 2RS 0.42–0.48× as long as 2M. *Color*: mesosoma usually very dark brown to black (80.0%), rarely dark reddish brown (20.0%); t1 entirely dark brown (40.0%) or t1 dark brown medially and yellow laterally (40.0%) or t1 reddish brown medially and yellow laterally (20.0%); t4 usually dark brown (80.0%), rarely brown medially, yellow laterally, and posterior edge dark brown (20.0%); remaining tergites dark brown.

Host.—Unknown.

Material examined.—Holotype ♀: USA, South Carolina, Greenville County, Greenville, 18.ix.1955, G. and L. Townes (AEI). Allotype ♂: same data as holotype except 6.vii.1952 (AEI). Other determined material: all USA, North Carolina, Transylvania County, Pisgah National Forest except 1♀, South Carolina, Greenville County, Paris Mountain State Park, 16.–21.v.1999, R. R. Kula, Malaise trap; 1♀, Coontree Creek Trail, 17.–21.v.1999, R. R. Kula, Malaise trap; 1♀, Pink Beds, 17.v.1999, R. R. Kula, sweep net; 1♀, 3♂, Coontree Creek Trail, 18.v.1999, R. R. Kula, sweep net; 1♂, Pink Beds, 19.v.1999, R. R. Kula, sweep net (det. Kula) (TAMU).

Diagnosis.—Within the *striativentris*-group *O. clevelandensis* Fischer, *O. niobe*, and *O. weemsi* are morphologically similar to *O. intermissus*. Head coloration can be used to distinguish *intermissus* from all three species. The head is yellow with a very dark brown to black vertex in *intermissus*. The head is yellowish brown with a brown vertex in *clevelandensis*, entirely brown to yellowish brown in *niobe*, and mostly orange with a very dark brown vertex and a partially brown face in *weemsi*. Mesosomal coloration can also be used to distinguish *intermissus* from *clevelandensis* and *niobe*. In *intermissus* the mesosoma is usually very dark brown to black, while in *clevelandensis* and *niobe* the mesosoma is brown to dark brown. Additionally, *intermissus* can be distinguished from *clevelandensis* and *weemsi* using exposed ovipositor length and the number of antennal flagellomeres, respectively. In *intermissus* the ovipositor is relatively short (exposed ovipositor 0.18–0.32 mm long) and barely exserted from the abdomen, while in *clevelandensis* the ovipositor is long (exposed ovipositor 1.12 mm long) and conspicuously exserted from the abdomen. The number of flagellomeres in *intermissus* is 26–29, as opposed to 32 in *weemsi*.

Discussion.—*Opius intermissus* falls within the *striativentris*-group. Dark brown mesosomal coloration was observed in only one male specimen, and all other specimens have a very dark brown to black mesosoma. Distinct color differences were observed between female and male specimens. In females t4 is dark brown medially and yellow laterally or mostly yellow with the posterior edge dark brown. In males t4 is usually entirely dark brown to black. Yellow coloration on t4 was observed in only one male specimen. No biological data are associated with *intermissus*, but other species in the *striativentris*-group have been reared from leaf mining Agromyzidae (e.g. *O. abbyae*, *O. adductus*, *O. striativentris*).

Opius (*Gastrosema*) *oscinidis* (Ashmead)

Rhyssalus oscinidis Ashmead 1889 (1888): 630.
Eutrichopsis oscinidis: Viereck 1913: 559.
Opius oscinidis: Gahan 1915: 72, 90.
Opius (*Aulonotus*) *oscinidis*: Fischer 1977: 78, 87.
Opius pusilloides Fischer 1964: 413, 433. Synonym Marsh (1974).

Female.—*Head*: 1.21–1.35× as wide as long; eyes 0.65–0.72× as wide as long, glabrous; face entirely smooth to entirely rugulose, slightly raised mesally, usually setose (81.8%), rarely setiferous (18.2%); clypeus flattened to convex, ventral margin lobed mesally, usually setose (81.8%), rarely setiferous (18.2%); mandibles simple, with two apical teeth per mandible, setiferous; antennae with 21–22 flagellomeres. *Mesosoma*: 0.38–0.43 mm wide; 0.66–0.75 mm long; 0.53–0.60× as wide as long; 0.73–0.79× as wide as deep; 1.34–1.42× as long as deep; pronotum smooth laterally, crenulate in anterior furrow; notauli represented by anterior depressions; mesoscutum smooth, setiferous anteriorly and along lines where notauli would run if present; mesopleuron nearly entirely smooth, slightly to distinctly crenulate near tegulae, sternaulus distinctly crenulate; scutellar disc smooth; propodeum rugose, especially medially, setose; metapleuron setose. *Metasoma*: t1 0.69–1.00× as wide as long, longitudinally rugulose with two prominent dorsal carinae delimiting a raised median area; t2 often longitudinally carinate at posterior edge (63.6%), occasionally longitudinally carinate medially (36.4%); t3 often smooth (63.6%), occasionally longitudinally carinate at anterior edge (36.4%); remaining tergites smooth; exposed ovipositor 0.16–0.46 mm long. *Legs*: smooth, setiferous, hind tibia 0.91–1.00× as long as mesosoma length. *Wings*: hyaline; forewing stigma narrow and elongate; 2RS 0.42–0.59× as long as 3RSa; 2RS 0.33–0.43× as long as 2M; 3RSa 0.73–0.80× as long as 2M. *Color*: face and clypeus brownish yellow, remainder of head brown (54.6%) or head entirely brown (27.3%) or face and clypeus yellow, remainder of head brown (18.2%); mesosoma brown to dark brown; t1 dark brown;

t2 yellow (54.6%) or yellowish brown (45.5%); t3 often yellowish brown (63.6%), occasionally anterior half yellow, posterior half brown (27.3%), rarely anterior two thirds yellow, posterior one third brown (9.1%); t4 usually brown to dark brown (90.9%), rarely yellowish brown (9.1%); remaining tergites brown to dark brown; legs orangish yellow to yellow.

Male.—As in ♀ except: *Head*: 1.19× as wide as long. *Mesosoma*: 0.37 mm wide.

Hosts.—An undetermined species of *Chlorops* Meigen on *Plantago major* L. (Ashmead 1889); *Phytomyza orobanchia* Kaltenbach (Hennig 1953); *Ph. plantaginis* Robineau-Desvoidy (Muesebeck and Walkley 1951). All records need verification.

Material examined.—Holotype ♀, *O. oscinidis*: no locality data (USNM). Holotype ♀, *O. pusilloides*: USA, Allegany County, Thomas Road near Cumberland, 28.vi.1953, L. M. Walkley (USNM). Allotype ♂, *O. pusilloides*: USA, Maryland, Montgomery County, Cabin John, 21.viii.1917, R. M. Fouts (USNM). *Paratypes O. pusilloides*: all USA; 1♀, New York, Otsego County, Oneonta, 24.viii.1935, H. K. Townes; 1♀, New York, Otsego County, Oneonta, 2.ix.1935, H. K. Townes; 1♀, New York, Tompkins County, Ithaca, 7.ix.1935, H. K. Townes; 1♀, New York, Tompkins County, Ithaca, 11.ix.1935, H. K. Townes; 1♀, North Carolina, Transylvania County, Pink Beds, 22.vii.1952, G. and L. Townes; 1♀, North Carolina, Henderson County, Flat Rock, 6.ix.1952, G. and L. Townes; 1♀, South Carolina, Greenville County, Greenville, 24.v.1952, G. and L. Townes; 1♀, South Carolina, Greenville County, Greenville, 1.ix.1952, L. and G. Townes; 1♀, South Carolina, Greenville County, Greenville, 7.ix.1952, L. and G. Townes (AEI). Other determined material: 1♀, South Carolina, Greenville County, Greenville, 1.x.1954, G. and L. Townes (det. Fischer as *pusilloides*) (AEI).

Diagnosis.—*Opius oscinidis* is extremely different morphologically from all described Nearctic species in *Gastrosema*. In *oscinidis* t2 is at least partially longitudinally carinate, although it is nearly smooth in some individuals. Thus, *oscinidis* can be differentiated from all species in the *striativentris*-group based on tergite sculpture. *Opius oscinidis* lacks crenulations above the episternal scrobe in the posterior mesopleural furrow. Thus, *oscinidis* can be differentiated from all species in the *flaviceps*-group based on posterior mesopleural furrow sculpture. Additionally, *oscinidis* has a narrowly elongate second submarginal cell, while species in the *striativentris*-group often have a narrow but relatively short second submarginal cell. The second submarginal cell is shape variable for species in the *flaviceps*-group, but a narrowly elongate second submarginal cell, as exemplified by *oscinidis*, has not been observed for species in the *flaviceps*-group.

Discussion.—*Opius oscinidis* falls within the *oscinidis*-group. Marsh (1974) synonymized *O. pusilloides* with *oscinidis*. Comparison of the holotypes for *oscinidis* and *pusilloides* with a long series of determined *pusilloides* from the AEI and USNM verified the synonymy. Of the 21 described Nearctic species in *Gastrosema*, *O. oscinidis* is the only species that falls within the *oscinidis*-group. However, several species in other subgenera fit within the *oscinidis*-group (as noted above). All biological data associated with *oscinidis* needs verification. *Opius oscinidis* is morphologically similar to a species of *Opius* near *extiratus* that has been reared from *Phytomyza* spp. mining the leaves of hollies.

Opius (*Gastrosema*) *salmonensis* Fischer

Opius salmonensis Fischer 1964: 412, 438.
Opius (*Gastrosema*) *salmonensis*: Fischer 1977: 313, 385.

Female.—*Head*: 1.36–1.47× as wide as long; eyes 0.77–0.88× as wide as long, glabrous; face punctate, slightly raised mesally, setose; clypeus broadly hemielliptical, usually flattened (80.0%), rarely weakly convex (20.0%), ventral margin straight to slightly arched, often setose (60.0%), occasionally setiferous (40.0%); mandibles simple, with two apical teeth per mandible, often setose (60.0%), occasionally setiferous (40.0%); antennae with 21–28 flagellomeres. *Mesosoma*: 0.61–0.86 mm wide; 1.02–1.36 mm long; 0.57–0.64× as wide as long; 0.71–0.79× as wide as deep; 1.25–1.31× as long as deep; pronotum smooth to rugose laterally, rugose to crenulate in anterior and posterior furrows; notauli represented by deep anterior depressions; mesoscutum often smooth (60.0%), occasionally minutely coriaceous (40.0%), usually setose anteriorly and along lines where notauli would run if present (80.0%), rarely entirely setose (20.0%); mesopleuron minutely coriaceous, deeply crenulate near tegulae, sternaulus broadly crenulate to broadly lacunose; scutellar disc often smooth (60.0%), occasionally minutely coriaceous (40.0%); propodeum areolate-rugose, setiferous; metapleuron often setose (60.0%), occasionally setiferous (40.0%). *Metasoma*: t1 0.84–1.11× as wide as long, usually costate (80.0%), rarely rugose (20.0%); t2 costate; t3 often longitudinally carinate in anterior half and smooth in posterior half (60.0%), rarely entirely minutely coriaceous (20.0%) or entirely smooth (20.0%); remaining tergites smooth; exposed ovipositor 0.64–1.52 mm long. *Legs*: smooth, setiferous, hind tibia 0.73–0.84× as long as mesosoma length. *Wings*: hyaline; forewing stigma broad and wedge shaped; 2RS 0.57–0.67× as long as 3RSa; 2RS 0.42–0.45× as long as 2M; 3RSa 0.67–0.75× as long as 2M. *Color*: head mostly yellow (80.0%) or orangish yellow (20.0%), vertex dark brown, at least around ocelli; mesosoma usually very dark brown (80.0%), rarely reddish brown (20.0%); t1 usually dark brown (80.0%), rarely reddish brown (20.0%); t2 usually yellow (40.0%) or orangish yellow (40.0%), rarely reddish brown (20.0%); t3 anterior half yellow, posterior half dark brown (20.0%) or t3 anterior half orangish yellow, posterior half dark brown (20.0%) or t3 anterior one third orangish yellow, posterior two thirds dark brown (20.0%) or t3 entirely reddish brown (20.0%) or t3 entirely dark brown (20.0%); remaining tergites dark brown; legs yellow, metatibia and metatarsus usually yellow (80.0%), rarely yellowish brown (20.0%).

Male.—As in ♀ except: *Head*: face punctate (50.0%) or rugulose (50.0%); clypeus flattened, setiferous (50.0%) or setose (50.0%); mandibles setose; antennae with 23–30 flagellomeres. *Mesosoma*: 0.56–0.67 mm wide; 0.55–0.59× as wide as long; 0.70–0.77× as wide as deep; pronotum often minutely coriaceous laterally (75.0%), occasionally smooth laterally (25.0%); mesoscutum often minutely coriaceous (75.0%), occasionally smooth (25.0%), setose anteriorly and along lines where notauli would run if present; scutellar disc often minutely coriaceous (75.0%), occasionally smooth (25.0%); metapleuron often setose (75.0%), occasionally setiferous (25.0%). *Metasoma*: t1 0.79–1.00× as wide as long, rugose (50.0%), longitudinally rugose (25.0%), or costate (25.0%); t2 costate (50.0%), coriaceous (25.0%), or smooth with anterior edge longitudinally carinate (25.0%); t3 smooth (50.0%), minutely coriaceous (25.0%), or minutely coriaceous with anterior edge longitudinally carinate (25.0%); remaining tergites smooth. *Wings*: 2RS 0.61–0.75× as long as 3RSa; 2RS 0.43–0.50× as long as 2M; 3RSa 0.63–0.70× as long as 2M. *Color*: head mostly yellow, vertex dark brown; mesosoma very dark brown; t1 dark brown; t2 yellow (50.0%), orangish yellow (25.0%), or brownish yellow (25.0%); t3 anterior one third brownish yellow, posterior two thirds dark brown (25.0%) or t3 anterior half orangish yellow, posterior half dark brown (25.0%) or t3 anterior half yellow, posterior half dark brown (25.0%) or t3 anterior two thirds yellow, posterior one third dark brown (25.0%); remaining tergites dark brown; legs yellow, metatarsus often yellow (75.0%), occasionally yellowish brown (25.0%).

Host.—Unknown.

Material examined.—Holotype ♀: CANADA, British Columbia, Salmon Arm, shore of Shuswap Lake, 13.vii.1949, H. B. Leech (CAS). Other determined material: 2♂, CANADA, Province Québec, 50°03′N 77°07′W, 12.vi.–8.viii.1987, Leblanc (AEI); 1♀ USA, New Hampshire, Grafton County, Mount Cardigan (USNM); 1♀, USA, North Carolina, Macon County, Highlands, 22.vi.1977, H. and M. Townes; 1♀, USA, North Carolina, Macon County, Highlands, 26.vi.1977, H. and M. Townes; 1♀, USA, Wisconsin, Grant County, T6N R6W S17, 29.v.–3.vi.1975, gypsy moth Malaise trap; 1♂, USA, Wisconsin, Fond du Lac County, T13N R19E S23, 11.–18.vi.1975, gypsy moth Malaise trap; 1♂, USA, Wisconsin, Jackson County, T21N R4W S27, 16.–23.vi.1975, gypsy moth Malaise trap (det. Kula) (AEI).

Diagnosis.—Within the *flaviceps*-group *O. flaviceps* is morphologically similar to *O. salmonensis*. *Opius salmonensis* is conspicuously smaller than *flaviceps*. In *salmonensis* the mesosoma is 1.02–1.36 mm long, while in *flaviceps* the mesosoma is 1.84 mm long. In *salmonensis* the mesosoma is 0.56–0.86 mm wide, while in *flaviceps* the mesosoma is 0.98 mm wide. Additionally, exposed ovipositor length in *salmonensis* is 0.64–1.52 mm, as opposed to 1.78 mm in *flaviceps*.

Discussion.—*Opius salmonensis* falls within the *flaviceps*-group. One specimen of *salmonensis* in the USNM and five specimens of *salmonensis* in the AEI were misidentified as *O. flaviceps*. All specimens differ from the holotype of *flaviceps* in size and exposed ovipositor length (as detailed in the diagnosis for *salmonensis*).

Size differences were observed between female and male specimens of *salmonensis*. In females the mesosoma is 0.61–0.86 mm wide, while in males the mesosoma is 0.56–0.67 mm wide. In females the maximum mesosoma length is 1.36 mm, and in males the maximum mesosoma length is 1.15 mm. Differences in sculpture on t2 were also observed between the sexes. In females t2 is always costate, while in males t2 may be costate, coriaceous, or smooth with the anterior edge longitudinally carinate. Sculpture on t2 is generally reduced in males relative to females.

Unfortunately, no biological data are associated with *salmonensis*. However, the ovipositor of *salmonensis* is long relative to species that have been reared from leaf mining Agromyzidae (e.g. *O. abbyae*, *O. adductus*, *O. striativentris*). This suggests that *salmonensis* may attack a non-leaf miner host in a concealed situation.

Opius (*Gastrosema*) *striativentris* Gahan

Opius striativentris Gahan 1915: 72, 89.

Opius (*Gastrosema*) *striativentris*: Fischer 1977: 312, 393.

Opius gracillariae Gahan 1915: 72, 90. **New synonym.**

Female.—*Head*: 1.24–1.48× as wide as long; eyes 0.63–0.79× as wide as long, glabrous; face usually smooth with rugulose sculpture between antennal sockets and compound eyes (86.4%), rarely entirely smooth (13.6%), slightly raised (60.9%) or flattened (39.1%) mesally, setiferous; clypeus hemispherical to narrowly hemielliptical, convex, ventral margin straight to slightly arched, setiferous; mandibles simple, with two apical teeth per mandible, setiferous; antennae with 18–22 flagellomeres. *Mesosoma*: 0.35–0.50 mm wide; 0.56–0.82 mm long; 0.56–0.65× as wide as long; 0.78–1.00× as wide as deep; 1.31–1.61× as long as deep; pronotum usually coriaceous laterally (92.1%), rarely entirely smooth (4.6%) or dorsal half smooth ventral half coriaceous (3.4%), usually crenulate in anterior furrow (96.6%), rarely smooth (3.4%); notauli represented by anterior depressions; mesoscutum usually smooth (94.3%), rarely rugulose medially near transscutual articulation (5.7%), usually setiferous anteriorly and along lines where notauli would run if present

(86.4%), rarely setiferous anteriorly only (9.1%) or glabrous (4.6%); mesopleuron nearly entirely smooth, often smooth near tegulae (55.5%), occasionally rugulose to crenulate near tegulae (44.5%), sternaulus usually crenulate (86.4%), rarely rugulose (10.2%) or reduced to a smooth depression (3.41%); scutellar disc smooth; propodeum rugulose to rugose, usually setiferous (98.9%), rarely glabrous (1.1%); metapleuron usually setiferous (98.9%), rarely glabrous (1.1%). *Metasoma*: t1 1.00–1.56× as wide as long, usually rugulose (87.4%), rarely rugose (11.5%) or smooth (1.2%); t2 coriaceous; t3 coriaceous; t4 often smooth (59.8%), occasionally coriaceous (33.3%); remaining tergites smooth; ovipositor 0.37–0.48 mm long. *Legs*: smooth, setiferous, hind tibia 0.82–0.95× as long as mesosoma length. *Wings*: hyaline; forewing stigma narrow and elongate; 2RS 0.50–0.69× as long as 3RSa; 2RS 0.40–0.52× as long as 2M; 3RSa 0.73–0.87× as long as 2M. *Color*: head entirely dark brown to orangish yellow with vertex dark brown to black; mesonotum often brown to dark brown and conspicuously darker than rest of mesosoma (63.6%), occasionally entirely brownish orange to dark brown (36.4%); t1 usually yellow to brownish orange (94.3%), rarely light orangish brown (4.6%) or yellowish brown (1.2%); t2 brownish orange to yellow; t3 brownish orange to yellow; remaining tergites dark brown to orangish yellow; legs yellow, metatibia and metatarsus yellow to yellowish brown.

Male.—As in ♀ except: *Head*: 1.23–1.39× as wide as long; eyes 0.67–0.80× as wide as long; face often with rugulose sculpture between antennal sockets and compound eyes (73.3%), occasionally entirely smooth (26.7%). *Mesosoma*: 0.34–0.43 mm wide; 0.55–0.65× as wide as long; 0.77–0.90× as wide as deep; pronotum usually coriaceous laterally (86.7%), rarely smooth (13.3%), usually crenulate in anterior furrow (86.7%), rarely smooth (13.3%); mesoscutum usually smooth (96.7%), rarely rugulose medially near transscutual articulation (3.33%), usually setiferous anteriorly and along lines where notauli would run if present (93.3%), rarely setiferous anteriorly only (6.7%); mesopleuron nearly entirely smooth, often crenulate near tegulae (70.0%), occasionally smooth near tegulae (30.0%), sternaulus usually crenulate (86.7%), rarely reduced to a smooth depression (13.3%). *Wings*: 2RS 0.55–0.71× as long as 3RSa.

Hosts.—*Phytomyza glabricola* Kulp mining the leaves of *Ilex coriacea* (Pursh) and *I. glabra* (L.); *P. ilicicola* Loew (as *P. ilicis* Curtis) mining the leaves of *I. opaca* Soland. in Ait. (Langford and Cory 1937); *P. vomitoriae* Kulp mining the leaves of *I. vomitoria* Soland. in Ait.

Material examined.—Holotype ♀, *O. striativentris*: no locality data (USNM). Holotype ♀, *O. gracillariae*: no locality data (USNM). Other determined material: all USA; 1♀, Louisiana, Cameron Parish, Route 27, 2.i.1998, S. Scheffer; 1♀, Mississippi, Forrest County, De Soto National Forest, Route 13, 7.i.1998, S. Scheffer; 3♀, North Carolina, Montgomery County, Uwharrie National Forest, i.1996, S. Scheffer; 14♀, North Carolina, Moore County, Ebersole Holly Garden, 21.ii.1996, S. Scheffer; 6♀, North Carolina, Wake County, North Carolina State University Arboretum, 23.ii.1996, S. Scheffer; 1♀, North Carolina, New Hanover County, Carolina Beach State Park, 24.ii.1996, S. Scheffer; 1♀, North Carolina, iv.1996; 8♀, North Carolina, New Hanover County, Carolina Beach State Park, marina, 21.ii.1997, S. Scheffer; 3♀, North Carolina, New Hanover County, Carolina Beach State Park, Flytrap Trail, 26.i.1998, S. Scheffer; 26♀, 30♂, South Carolina, Berkeley County, Francis Marion National Forest, Big Ocean Bay, 18.ii.1997, S. Scheffer; 8♀, South Carolina, Charleston County, Francis Marion National Forest, Buck Hall, 19.ii.1997, S. Scheffer; 5♀, South Carolina, Berkeley County, Francis Marion National Forest, North Honey Hill Road, 19.ii.1997, S.

Scheffer; 1♀, South Carolina, Berkeley County, Francis Marion National Forest, Road 188, 19.ii.1997, S. Scheffer; 7♀, South Carolina, Berkeley County, Francis Marion National Forest, Big Ocean Bay, 21.i.1998, S. Scheffer; 2♀, Tennessee, Shelby County, Memphis Botanical Garden, 29.viii.1997, S. Scheffer; 1♀, Texas, Jasper County, Angelina National Forest, Boykin Springs Trail, 2.i.1998, S. Scheffer (det. Kula as *striativentris*) (TAMU).

Diagnosis.—Within the *striativentris*-group *O. castaneigaster* and *O. hancockanus* are morphologically similar to *O. striativentris.* Characters used to differentiate *striativentris* from *castaneigaster* can be found in the diagnosis for *castaneigaster.* The shape of the mesosoma and t1 width to length ratios can be used to distinguish *striativentris* from *hancockanus.* In *striativentris* the mesosoma is 1.31–1.61× as long as deep and similar in shape to *castaneigaster.* In *hancockanus* the mesosoma is 1.26× as long as deep and similar in shape to *niobe.* Tergite 1 is 1.00–1.56× as wide as long in *striativentris,* while t1 is 0.65× as wide as long in *hancockanus.*

Discussion.—*Opius striativentris* falls within the *striativentris*-group. In Fischer's subgeneric classification individuals with a crenulate sternaulus fall within *Gastrosema,* but individuals with a smooth sternaulus fall within *Merotrachys. Opius striativentris* is retained in *Gastrosema* because the majority of individuals (i.e. 91.7%) fall within *Gastrosema.*

Comparison of the holotype of *O. gracillariae* with hundreds of *striativentris* specimens revealed that *gracillariae* falls within the morphological limits of *striativentris* as defined in this study. Thus, *O. gracillariae* Gahan 1915 is a new synonym of *O. striativentris* Gahan 1915. The holotype of *gracillariae* is morphologically similar to *striativentris* reared from *P. glabricola* infesting *I. coriacea* and *I. glabra. Opius gracillariae* and *striativentris* were both originally described in Gahan (1915). *Opius striativentris* is designated the senior synonym because the name *striativentris* has been associated with a greater number of studies and appears more frequently in the literature than *gracillariae.* Gahan (1915) reported that *gracillariae* was reared from *Porphyrosela desmiodella* (Clément). This record is clearly invalid because *P. desmiodella* is a lepidopteran. Opiinae, as currently defined, is limited to braconids that are endoparasitoids of cyclorrhaphous Diptera. However, *Porphyrosela desmiodella* feeds on *Desmodium* Desv., and *Japanagromyza desmodivora* Spencer is an agromyzid that mines the leaves of *D. tortuosum* DC. Thus, Gahan's *gracillariae* may have actually been reared from an agromyzid.

ACKNOWLEDGMENTS

This work was supported by National Science Foundation Partnerships for Enhancing Expertise in Taxonomy (PEET) grant number DEB9712543 awarded to R. A. Wharton and J. B. Woolley (TAMU). I am especially grateful for the guidance and advice provided by Bob Wharton. My sincere thanks to Jim Woolley for contributing several useful suggestions during the course of this research. Many thanks to Jim Ehrman (Digital Microscopy Facility, Mount Allison University) for original SEMs and Greg Zolnerowich (Kansas State University) for advice on the construction of plates. Special thanks to Sonja Scheffer (Systematic Entomology Laboratory) for providing several hundred reared specimens of *O. striativentris.* Material supplied by the following curators and staff members made this research possible: David Wahl (AEI), Robert Zuparko (CAS), Henri Goulet (CNCI), Steven Krauth (IRCW), Philip Perkins (MCZ), Stefan Cover (MCZ), David Smith (USNM), and Cathy Anderson (USNM).

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